Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1-2 canceled

3. (currently amended) A coreless ~~printed circuit board~~ transformer comprising first and second windings ~~deposited on a printed circuit board~~, said first winding being disposed in a first plane, said second winding being ~~deposited on a side of said circuit board that is opposed to a side of said circuit board whereon~~ disposed in a second plane proximate and parallel to said first ~~winding is deposited~~ plane, wherein said transformer is adapted to be operated only at a frequency that is less than a resonant frequency of said transformer, said frequency being between 300 kHz and 20 MHz.

4. (currently amended) A coreless ~~printed circuit board~~ transformer comprising first and second windings ~~deposited on a printed circuit board~~, said first winding being disposed in a first plane, said second winding being ~~deposited on a side of said circuit board that is opposed to a side of said circuit board whereon~~ disposed in a second plane proximate and parallel to said first ~~winding is deposited~~ plane, wherein said transformer is adapted to be operated by a high-frequency carrier signal modulated by a low-frequency switching signal, and wherein said transformer is adapted to be operated only at a frequency that is less than a resonant frequency of said transformer.

5. (original) A transformer as claimed in claim 4 wherein said carrier signal is at an optimum frequency, said optimum frequency being a frequency at which an impedance of said transformer is a maximum.

6. (currently amended) A transformer as claimed in claim 4 wherein said high frequency carrier signal is in ~~the~~ a range of from 300 kHz to 20 MHz and said low frequency switching signal is in ~~the~~ a range of from DC to 300 kHz.

7. (currently amended) A coreless ~~printed circuit board~~ transformer comprising first and second windings ~~deposited on a printed circuit board~~, said first winding being disposed in a first plane, said second winding being ~~deposited on a side of said circuit board that is opposed to a side of said circuit board whereon~~ disposed in a second plane proximate and parallel to said first ~~winding is deposited~~ plane, further comprising means for adjusting a resonant frequency of ~~the~~ said transformer, wherein said transformer is adapted to be operated only at a frequency that is less than said resonant frequency of said transformer.

8. (original) A transformer as claimed in claim 7 wherein said adjusting means comprises a capacitance connected across the second winding.

9. (withdrawn) A gate drive circuit for a power MOSFET or IGBT device, wherein the gate of a said device is isolated from an input power supply by a coreless printed circuit board transformer, said transformer comprising first and second windings deposited on opposed sides of a printed circuit board.

10. (withdrawn) A gate drive circuit as claimed in claim 9 wherein said transformer is operated at a frequency corresponding to the maximum impedance of said transformer.

11. (withdrawn) A gate drive circuit as claimed in claim 9 wherein said transformer is driven and said gate is switched at a high-frequency in the range of from 300 kHz to 20 MHz.

12. (withdrawn) A gate drive circuit as claimed in claim 9 wherein said transformer is operated by a high frequency carrier signal, said carrier signal being modulated by a switching frequency for switching said gate.

13. (withdrawn) A gate drive circuit as claimed in claim 12 wherein said high frequency carrier signal is at an optimum frequency corresponding to a maximum impedance of said transformer.

14. (withdrawn) A gate drive circuit as claimed in claim 12 wherein said high frequency carrier signal is in the range of from 300 kHz to 20 MHz and said low frequency switching signal is in the range of from DC to 300 kHz.

15. (withdrawn) A gate drive circuit as claimed in claim 9 wherein said transformer includes means for adjusting the resonant frequency of the transformer.

16. (withdrawn) A gate drive circuit as claimed in claim 15 wherein said adjusting means comprises a capacitance connected across said second winding.

17. (withdrawn) A method of driving a gate of a power MOSFET or IGBT device comprising isolating said gate from a power supply by means of a coreless printed circuit board transformer, said transformer comprising first and second windings deposited on opposed sides of a printed circuit board with no transformer core therebetween.

18. (withdrawn) A method as claimed in claim 17 wherein said gate is drive at a frequency at which the impedance of said transformer is at a maximum.

19. (withdrawn) A method as claimed in claim 17 wherein said gate is driven at a high frequency in the range of from 300 kHz to 20 MHz.

20. (withdrawn) A method as claimed in claim 17 wherein a low switching frequency is used to modulate a high frequency carrier signal input to said transformer, and wherein said carrier signal is demodulated after said transformer to drive said gate at said low switching frequency.

21. (withdrawn) A method as claimed in claim 20 wherein said carrier signal is at an optimum frequency for said transformer corresponding to a maximum impedance of said transformer.

22. (withdrawn) A method as claimed in claim 20 wherein said high frequency carrier signal is in the range from 300 kHz to 20 MHz and said low frequency switching signal is in the range of from DC to 300 kHz.

23. (withdrawn) A modem for digital data communication including a coreless printed circuit board transformer comprising first and second windings deposited on opposed sides of a printed circuit board and having no transformer core therebetween.

24-26 (canceled)

27. (currently amended) A coreless ~~printed circuit board~~ transformer comprising first and second windings ~~deposited on a printed circuit board,~~ said first winding being disposed in a first plane, said second winding being ~~deposited on a side of said circuit board that is opposed to a side of said circuit board whereon~~ disposed in a second plane proximate and parallel to said first ~~winding is deposited~~ plane, wherein said transformer is adapted to be operated at an optimum frequency, said optimum frequency being a frequency near a frequency at which an impedance of a transformer equivalent circuit is at a maximum, and wherein said transformer is adapted to be operated only at a frequency that is less than a resonant frequency of said transformer, said frequency being from 100 kHz to at least 20 MHz.

28. (currently amended) A coreless ~~printed circuit board~~ transformer comprising first and second windings ~~deposited on a printed circuit board~~, said first winding being disposed in a first plane, said second winding being ~~deposited on a side of said circuit board that is opposed to a side of said circuit board whereon~~ disposed in a second plane proximate and parallel to said first ~~winding is deposited~~ plane, wherein said transformer is adapted to be operated at an optimum frequency, said optimum frequency being a frequency near a frequency at which an

impedance of a transformer equivalent circuit is at a maximum, and wherein said transformer is adapted to be operated by a high-frequency carrier signal modulated by a low-frequency switching signal, said carrier signal being at a frequency corresponding to a maximum impedance of ~~the~~ said transformer, and wherein said transformer is adapted to be operated only at a frequency that is less than a resonant frequency of said transformer.

29. (currently amended) A coreless ~~printed circuit board~~ transformer comprising first and second windings ~~deposited on a printed circuit board~~, said first winding being disposed in a first plane, said second winding being ~~deposited on a side of said circuit board that is opposed to a side of said circuit board whereon~~ disposed in a second plane proximate and parallel to said first ~~winding is deposited~~ plane, wherein said transformer is adapted to be operated at an optimum frequency, said optimum frequency being a frequency at which an impedance of a transformer equivalent circuit of said transformer is a maximum, and wherein said transformer is adapted to be operated only at a frequency that is less than a resonant frequency of said transformer, said frequency being from 100 kHz to at least 20 MHz.

30. (withdrawn) A gate drive circuit for a power MOSFET or IGBT device, wherein the gate of said device is isolated from an input power supply by a coreless printed circuit board transformer as claimed in claim 26.

31. (withdrawn) A method of driving a gate of a power MOSFET or IGBT device comprising isolating said gate from a power supply by means of a coreless printed circuit board transformer, said transformer comprising first and second windings deposited on opposed sides of a printed circuit board with no transformer core therebetween, wherein said gate is driven at a frequency at which the impedance of said transformer is at a maximum.

32. (withdrawn) A method as claimed in claim 31 wherein said gate is driven at a frequency in the range of from about 100 kHz to at least 20 MHz.

33. (withdrawn) A method as claimed in claim 31 wherein a low frequency switching signal is used to modulate a high-frequency carrier signal input to said transformer, and wherein said carrier signal is demodulated after said transformer to drive said gate at said low switching frequency, said carrier signal being at a said maximum impedance frequency.

34. (withdrawn) A method as claimed in claim 33 wherein said carrier signal is at a frequency of from about 100 kHz to at least 20 MHz and said switching signal is at a frequency of from DC to 300 kHz.

35. (withdrawn) Power converter apparatus including a coreless printed circuit board transformer comprising first and second windings deposited on opposed sides of a printed circuit board and having no transformer core therebetween, wherein said transformer is operated at a maximum efficiency frequency which is slightly lower than the frequency at which the impedance of a transformer equivalent circuit is at its maximum.

36. (currently amended) A coreless ~~printed circuit board~~ transformer comprising first and second windings ~~deposited on a printed circuit board~~, said first winding being disposed in a first plane, said second winding being ~~deposited on a side of said circuit board that is opposed to a side of said circuit board whereon~~ disposed in a second plane proximate and parallel to said first ~~winding is deposited~~ plane, wherein said transformer is adapted to be operated at an optimum frequency, said optimum frequency being a frequency at which an impedance of said transformer is a maximum, and wherein said transformer is adapted to be operated only at a frequency that is less than a resonant frequency of said transformer.

37. (currently amended) A coreless ~~printed circuit board~~ transformer comprising first and second windings ~~deposited on a printed circuit board~~, said first winding being disposed in a first plane, said second winding being ~~deposited on a side of said circuit board that is opposed to a side of said circuit board whereon~~ disposed in a second plane proximate and parallel to said first ~~winding is deposited~~ plane, wherein said transformer is adapted to be operated at an optimum frequency, said optimum frequency being a frequency at which an impedance of a

transformer equivalent circuit of said transformer is a maximum, wherein said optimum frequency is between 300 kHz and 20 MHz, and wherein said transformer is adapted to be operated only at a frequency that is less than a resonant frequency of said transformer.

38. (previously presented) A transformer as claimed in claim 4 wherein said carrier signal is at an optimum frequency, said optimum frequency being a frequency at which an impedance of a transformer equivalent circuit of said transformer is a maximum.

39. (currently amended) A coreless ~~printed circuit board~~ transformer comprising first and second windings ~~deposited on a printed circuit board~~, said second winding being ~~deposited on a side of said circuit board that is opposed to a side of said circuit board whereon~~ disposed in a second plane proximate and parallel to said first ~~winding is deposited~~ plane, wherein said transformer is adapted to be operated at an optimum frequency, said optimum frequency being a frequency at which an impedance of a transformer equivalent circuit of said transformer is a maximum, further comprising means for adjusting said optimum frequency, and wherein said transformer is adapted to be operated only at a frequency that is less than a resonant frequency of said transformer.

40. (previously presented) A transformer as claimed in claim 36 further comprising means for adjusting said optimum frequency.

41. (previously presented) A transformer as claimed in claim 5 further comprising means for adjusting said optimum frequency.

42. (previously presented) A transformer as claimed in claim 38 further comprising means for adjusting said optimum frequency.

43. (previously presented) A transformer as claimed in claim 39 wherein said adjusting means comprises a variable capacitance connected across the second winding.

44. (previously presented) A transformer as claimed in claim 40 wherein said adjusting means comprises a variable capacitance connected across the second winding.

45. (previously presented) A transformer as claimed in claim 41 wherein said adjusting means comprises a variable capacitance connected across the second winding.

46. (previously presented) A transformer as claimed in claim 42 wherein said adjusting means comprises a variable capacitance connected across the second winding.